

CLAIMS

What is claimed is:

1. A method for data recovery in a disk drive system, comprising the steps of:  
reading data from a disk drive;  
generating an error detection and correction code from the data read from the disk drive; and  
in parallel with the reading of the data from the disk drive and the generating an error detection and correction code from the data read from the disk drive, reading error detection and correction code metadata.
2. The method of Claim 1, further comprising comparing the generated error detection and correction code of the read data with the error detection and correction code stored as metadata.
3. The method of Claim 2, if the generated error detection and correction code of the read data matches the error detection and correction code stored as metadata, then accepting the data read from the disk drive as valid data.
4. The method of Claim 2, if the generated error detection and correction code of the read data does not match the error detection and correction code stored as metadata, then reconstructing data from parity data.
5. The method of Claim 4, further comprising generating an error detection and correction code for the reconstructed data.
6. The method of Claim 5, further comprising comparing the error detection and correction code stored as metadata with the reconstructed data error detection and correction code.

7. The method of Claim 6, if the error detection and correction code stored as metadata matches the reconstructed data error detection and correction code, then accepting the reconstructed data as valid data.

8. The method of Claim 6, if the error detection and correction code stored as metadata does not match the reconstructed data error detection and correction code, then accepting the data read from the data drive as valid data.

9. The method of Claim 1, wherein the error detection and correction code is a cyclic redundancy check.

10. The method of Claim 1, wherein the size of the error detection and correction code metadata is a data block.

11. The method of Claim 1, wherein the size of the error detection and correction code metadata is 4 bytes per 512 bytes of data read from the disk drives.

12. The method of Claim 1, wherein the error detection and correction code metadata is controller independent.

13. The method of Claim 4, wherein the error detection and correction code metadata, the parity data, and the data read from the disk drives are all stored on separate disk drives.

14. A system for data storage management and data recovery, comprising:  
a disk array controller;  
a plurality of disk drives coupled to the disk array controller,  
wherein the disk array controller uses error detection and correction code metadata to make a first determination as to whether data read from a disk drive is valid and, if the disk array controller determines that the data read from the disk drive is not valid, then the disk array controller uses the error detection and correction code stored as metadata again to make a second determination as to whether the data read from the disk drive is to be presumed valid.
15. The system of Claim 14, wherein the disk array controller makes the determinations through hardware.
16. The system of Claim 14, wherein the disk array controller makes the determinations through software.
17. The system of Claim 15, wherein the hardware includes a shift register and exclusive or gating circuitry.
18. The system of Claim 14, wherein the first determination is made using an error detection and correction code of data read from the disk drives and the second determination is made using an error detection and correction code of reconstructed data from parity.
19. The system of Claim 18, wherein the error detection and correction code metadata, the error detection and correction code of the data read from the disk drives, and the error detection and correction code of reconstructed data from parity are on separate disk drives.

20. The system of Claim 19, wherein the error detection and correction code of the data read from the disk drives is generated on the fly.

21. The system of Claim 19, wherein the error detection and correction code of the data read from the disk drives is generated from the data after it has been received by the disk array controller's data cache.

22. The system of Claim 19, wherein data integrity protection occurs at a byte level.

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23. A method of disk drive data detection and recovery, comprising using error detection and correction code metadata to determine data validity of data read from a disk drive.
24. The method of Claim 23, wherein the error detection and correction code is cyclic redundancy check.
25. The method of Claim 23, wherein the error detection and correction code metadata is compared against an error detection and correction code generated from the data read from the disk drive.
26. The method of Claim 23, wherein the error detection and correction code metadata is compared against an error detection and correction code generated from data reconstructed using parity data.
27. The method of Claim 23, wherein, if the error detection and correction code metadata equals the error detection and correction code generated from the data drive or if the error detection and correction code metadata does not equal the error detection and correction code generated from data reconstructed from parity, then accepting the data read from the disk drive as valid.
28. The method of Claim 23, wherein, if the error detection and correction code metadata equals the error detection and correction code generated from data reconstructed from parity, then accepting the data reconstructed from parity as valid.